

**567—135.5(455B) Release detection.****135.5(1) General requirements for all UST systems.**

*a.* Owners and operators of UST systems must provide a method, or combination of methods, of release detection that:

(1) Can detect a release from any portion of the tank and the connected underground piping that routinely contains product;

(2) Is installed and calibrated in accordance with the manufacturer's instructions, including routine maintenance and service checks for operability or running condition; and

(3) Beginning October 13, 2021, is operated and maintained, and electronic and mechanical components are tested for proper operation, in accordance with one of the following:

1. Manufacturer's instructions;

2. A code of practice developed by a nationally recognized association or independent testing laboratory; or

3. Requirements determined by the department to be no less protective of human health and the environment than the two options listed above.

(4) A test of the proper operation must be performed at least annually and, at a minimum, as applicable to the facility, cover the following components and criteria:

1. Automatic tank gauge and other controllers: test alarm; verify system configuration; test battery backup;

2. Probes and sensors: inspect for residual buildup; ensure floats move freely; ensure shaft is not damaged; ensure cables are free of kinks and breaks; test alarm operability or running condition and communication with controller;

3. Automatic line leak detector: test operation to meet criteria in paragraph 135.5(5)"a" by simulating a leak;

4. Vacuum pumps and pressure gauges: ensure proper communication with sensors and controller; and

5. Handheld electronic sampling equipment associated with groundwater and vapor monitoring; ensure proper operation.

NOTE regarding subparagraphs 135.5(1)"a"(3) and (4): The following code of practice may be used to comply with subparagraphs 135.5(1)"a"(3) and (4): Petroleum Equipment Institute Publication RP1200, "Recommended Practices for the Testing and Verification of Spill, Overfill, Leak Detection and Secondary Containment Equipment at UST Facilities."

(5) Meets the performance requirements in subrule 135.5(4) or 135.5(5), with any performance claims and their manner of determination described in writing by the equipment manufacturer or installer. In addition, methods conducted in accordance with paragraphs 135.5(4)"b," "c," and "d" and paragraphs 135.5(5)"a" and "b" must be capable of detecting the leak rate or quantity specified for that method with a probability of detection of 0.95 and a probability of false alarm of 0.05.

*b.* When a release detection method operated in accordance with the performance standards in subrule 135.5(4) or 135.5(5) indicates a release may have occurred, owners and operators must notify the department in accordance with rule 567—135.6(455B).

*c.* When an owner and operator continually show the inability to conduct leak detection with the method being used, the department may require the owner and operator to find an alternative leak detection method. If the owner and operator cannot demonstrate compliance with leak detection, delivery prohibition in accordance with subrule 135.3(8) may be enforced.

*d.* Any UST system that cannot apply a method of release detection that complies with the requirements of this rule must complete the closure procedures in rule 567—135.15(455B). For previously deferred UST systems described in rules 567—135.1(455B) and 567—135.21(455B), this requirement applies after the effective dates described in subrule 135.1(3) and paragraph 135.21(1)"a."

*e.* Any UST facility that uses pressurized piping and dispenses product in the absence of a Class A, B, or C operator shall comply with the following requirements:

(1) Employ automatic line leak detectors that do one or more of the following:

1. Shut down the submersible pump when a leak is detected.

2. Restrict the flow of product when a leak is detected.
3. Trigger an audible or visual alarm when a leak is detected.
- (2) At facilities implementing 135.5(1) "e"(1)"2" or "3," the facility's operator shall be notified or shall conduct a visit through one of the following methods:

1. Notification of the Class B operator by immediate electronic communication.
2. Signage directing the customer to contact the Class B operator or a designated contact person. The sign must be immediately visible to the customer and state that slow flow or an audible or visual alarm is an indication of a possible release. The sign must provide a 24-hour telephone number of the Class B operator or designee and direct the customer to stop dispensing product.

3. Daily visit to the site by a Class A, B, or C operator or designee. Visits shall include observation of every automatic line leak detector for shutdown, alarm, or restricted flow conditions. Methods of observing for restricted flow conditions may include dispensing product into a proper container or personal vehicle, observing a customer dispense product into a vehicle, or another method approved by the department. Owners and operators shall maintain an onsite log of site visits to demonstrate compliance with this provision. The log shall include the name of the observer and method used to observe the status of the automatic line leak detectors.

(3) All UST facilities subject to 135.5(1) "e" must comply with its provisions by July 1, 2014.

**135.5(2) Requirements for petroleum UST systems.** Owners and operators of petroleum UST systems must provide release detection for tanks and piping as follows:

*a. Tanks.* Tanks must be monitored at least every 30 days for releases using one of the methods listed in paragraphs 135.5(4) "d" to "i" except that:

- (1) Tanks installed after November 28, 2007, must use interstitial monitoring of the secondary containment as the primary leak detection method in accordance with paragraph 135.5(4) "g."

- (2) Tanks installed on or before November 28, 2007, with capacity of 550 gallons or less and tanks with a capacity of 551 to 1,000 gallons that meet the tank diameter criteria in paragraph 135.5(4) "b" may use manual tank gauging (conducted in accordance with paragraph 135.5(4) "b").

*b. Piping.* Underground piping that routinely contains regulated substances must be monitored for releases in a manner that meets one of the following requirements:

- (1) *Pressurized piping.* Underground piping that conveys regulated substances under pressure must:

1. Be equipped with an automatic line leak detector conducted in accordance with paragraph 135.5(5) "a"; and

2. Have an annual line tightness test conducted in accordance with paragraph 135.5(5) "b" or have monthly monitoring conducted in accordance with paragraph 135.5(5) "c." Piping installed after November 28, 2007, must use interstitial monitoring of the piping secondary containment in accordance with paragraph 135.5(5) "d."

- (2) *Suction piping.* Underground piping that conveys regulated substances under suction must either have a line tightness test conducted at least every three years and in accordance with paragraph 135.5(5) "b," or use a monthly monitoring method conducted in accordance with paragraph 135.5(5) "c." Remote fill is considered suction piping. No release detection is required for suction piping that is designed and constructed to meet the following standards:

1. The below-grade piping operates at less than atmospheric pressure;

2. The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if the suction is released;

3. Only one check valve is included in each suction line;

4. The check valve is located directly below and as close as practical to the suction pump; and

5. A method is provided that allows compliance with "2" through "4" to be readily determined.

- (3) Piping installed or replaced must meet one of the following:

1. Pressurized piping must be monitored for releases at least every 30 days in accordance with paragraph 135.5(5) "d" and be equipped with an automatic line leak detector.

2. Suction piping must be monitored for releases at least every 30 days. No release detection is required for suction piping that meets paragraphs 135.5 "b"(2)"1" through 135.5 "b"(2)"5."

**135.5(3) Requirements for hazardous substance UST systems.** Owners and operators of hazardous substance UST systems must have containment that meets the following requirements and monitor these systems pursuant to paragraph 135.5(4) “g” at least every 30 days:

- a. Secondary containment systems must be designed, constructed and installed to:
  - (1) Contain regulated substances leaked from the primary containment until they are detected and removed;
  - (2) Prevent the release of regulated substances to the environment at any time during the operational life of the UST system; and
  - (3) Be checked for evidence of a release at least every 30 days.
- b. Double-walled tanks must be designed, constructed, and installed to:
  - (1) Contain a leak from any portion of the inner tank within the outer wall; and
  - (2) Detect the failure of the inner wall.
- c. External liners (including vaults) must be designed, constructed, and installed to:
  - (1) Contain 100 percent of the capacity of the largest tank within its boundary;
  - (2) Prevent the interference of precipitation or groundwater intrusion with the ability to contain or detect a release of regulated substances; and
  - (3) Surround the tank completely (i.e., it is capable of preventing lateral as well as vertical migration of regulated substances).
- d. Underground piping must be equipped with secondary containment that satisfies the requirements of this subrule (e.g., trench liners, jacketing of double-walled pipe). In addition, underground piping that conveys regulated substances under pressure must be equipped with an automatic line leak detector in accordance with paragraph 135.5(5) “a”;
- e. For hazardous substance UST systems installed on or before November 28, 2007, other methods of release detection may be used if owners and operators:
  - (1) Demonstrate to the department that an alternate method can detect a release of the stored substance as effectively as any of the methods allowed in paragraphs 135.5(4) “b” to “i” can detect a release;
  - (2) Provide information to the department on effective corrective action technologies, health risks, and chemical and physical properties of the stored substance, and the characteristics of the UST site; and
  - (3) Obtain approval from the department to use the alternate release detection method before the installation and operation of the new UST system.

**135.5(4) Methods of release detection for tanks.** Each method of release detection for tanks used to meet the requirements of 135.5(2) must be conducted in accordance with the following:

- a. *Inventory control.* Product inventory control (or another test of equivalent performance) must be conducted monthly to detect a release of at least 1.0 percent of flow-through plus 130 gallons on a monthly basis in the following manner:
  - (1) Inventory volume measurements for regulated substance inputs, withdrawals, and the amount still remaining in the tank are recorded each operating day;
  - (2) The equipment used is capable of measuring the level of product over the full range of the tank’s height to the nearest 1/8 of an inch;
  - (3) The regulated substance inputs are reconciled with delivery receipts by measurement of the tank inventory volume before and after delivery;
  - (4) Deliveries are made through a drop tube that extends to within 1 foot of the tank bottom;
  - (5) Product dispensing is metered and recorded within the local standards for meter calibration or an accuracy of 6 cubic inches for every 5 gallons of product withdrawn; and
  - (6) The measurement of any water level in the bottom of the tank is made to the nearest 1/8 of an inch at least once a month.

NOTE: Practices described in the American Petroleum Institute Recommended Practice 1621, “Recommended Practice for Bulk Liquid Stock Control at Retail Outlets,” may be used, where applicable, as guidance in meeting the requirements of subparagraphs 135.5(4) “a”(1) to 135.5(4) “a”(6).

- b. *Manual tank gauging.* Manual tank gauging must meet the following requirements:

- (1) Tank liquid level measurements are taken at the beginning and end of the test period during which no liquid is added to or removed from the tank;
- (2) Level measurements are based on an average of two consecutive stick readings at both the beginning and ending of the period;
- (3) The equipment is capable of measuring the level of product over the full range of the tank's height to the nearest 1/8 of an inch;
- (4) A release is suspected and subject to the requirements of rule 567—135.6(455B) if the variation between the beginning and ending measurements exceeds the weekly or monthly standards in the following table. Immediately contact the department if these standards are exceeded.

Nominal Tank Capacity	Minimum Duration of Test	Weekly Standard (one test)	Monthly Standard (four-test average)
550 gallons or less	36 hours	10 gallons	5 gallons
551-1,000 gallons (when tank diameter is 64 inches)	44 hours	9 gallons	4 gallons
551-1,000 gallons (when tank diameter is 48 inches)	58 hours	12 gallons	6 gallons
551-1,000 gallons (also requires annual tank tightness testing)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires annual tank tightness test)	36 hours	26 gallons	13 gallons

(5) Only those tanks of 550 gallons or less nominal capacity or tanks of 551 to 1,000 gallons nominal capacity with diameters of 64 inches or 48 inches may use this as the sole method of release detection. Other tanks of 551 to 2,000 gallons may use this method in place of inventory control in paragraph 135.5(4) "a." Tanks of greater than 2,000 gallons nominal capacity may not use this method to meet the requirements of this rule.

*c. Tank tightness testing.* Tank tightness testing (or another test of equivalent performance) must be capable of detecting a 0.1 gallon-per-hour leak rate from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

The tank tightness test procedure must be certified by a third party and meet US EPA testing procedures. The testing procedures are found in *Standard Test Procedures for Evaluating Leak Detection Methods: Volumetric Tank Tightness Testing Methods* (EPA /530/UST-90/004) March 1990 or as revised by EPA or *Non-Volumetric Tank Tightness Testing Methods* (EPA /530/UST-90/005) March 1990 or as revised by EPA.

*d. Automatic tank gauging.* Equipment for automatic tank gauging that tests for the loss of product and conducts inventory control must meet the following requirements:

- (1) The automatic product level monitor test can detect a 0.2 gallon-per-hour leak rate from any portion of the tank that routinely contains product;
- (2) The automatic tank gauging equipment must meet the inventory control (or other test of equivalent performance) requirements of paragraph 135.5(4) "a";
- (3) The leak test must be performed according to manufacturer specifications;
- (4) The automatic tank gauging equipment must be certified by a third party and meet US EPA testing procedures in *Standard Test Procedures for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems (ATGS)* (EPA /530/UST-90/006) March 1990 or as revised by US EPA; and
- (5) The test must be performed with the system operating in one of the following modes:
  1. In-tank static testing conducted at least once every 30 days; or

2. Continuous in-tank leak detection operating on an uninterrupted basis or operating within a process that allows the system to gather incremental measurements to determine the leak status of the tank at least once every 30 days.

*e. Vapor monitoring.* Testing or monitoring for vapors within the soil gas of the excavation zone must meet the following requirements:

(1) The materials used as backfill are sufficiently porous (e.g., gravel, sand, crushed rock) to readily allow diffusion of vapors from releases into the excavation area;

(2) The stored regulated substance, or a tracer compound placed in the tank system, is sufficiently volatile (e.g., gasoline) to result in a vapor level that is detectable by the monitoring devices located in the excavation zone in the event of a release from the tank;

(3) The measurement of vapors by the monitoring device is not rendered inoperative by the groundwater, rainfall, or soil moisture or other known interferences so that a release could go undetected for more than 30 days;

(4) The level of background contamination in the excavation zone will not interfere with the method used to detect releases from the tank;

(5) The vapor monitors are designed and operated to detect any significant increase in concentration above background of the regulated substance stored in the tank system, a component or components of that substance, or a tracer compound placed in the tank system;

(6) In the UST excavation zone, the site is assessed to ensure compliance with the requirements in subparagraphs 135.5(4) "e"(1) through (4) and to establish the number and positioning of monitoring wells that will detect releases within the excavation zone from any portion of the tank that routinely contains product;

(7) Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering; and

(8) The vapor product detector must be certified by a third party and meet US EPA testing procedures in *Standard Test Procedures for Evaluating Leak Detection Methods: Vapor-Phase Out-of-Tank Product Detectors* (EPA/530/UST-90/008) March 1990 or as revised by US EPA.

*f. Groundwater monitoring.* Testing or monitoring for liquids on the groundwater must meet the following requirements:

(1) The regulated substance stored is immiscible in water and has a specific gravity of less than 1;

(2) Groundwater is never more than 20 feet from the ground surface and the hydraulic conductivity of the soil(s) between the UST system and the monitoring wells or devices is not less than 0.01 cm/sec (e.g., the soil should consist of gravels, coarse to medium sands, coarse silts or other permeable materials);

(3) The slotted portion of the monitoring well casing must be designed to prevent migration of natural soils or filter pack into the well and to allow entry of regulated substance on the water table into the well under both high and low groundwater conditions;

(4) Monitoring wells shall be sealed from the ground surface to the top of the filter pack;

(5) Monitoring wells or devices intercept the excavation zone or are as close to it as is technically feasible;

(6) The continuous monitoring devices or manual methods used can detect the presence of at least 1/8 of an inch of free product on top of the groundwater in the monitoring wells;

(7) Within and immediately below the UST system excavation zone, the site is assessed to ensure compliance with the requirements in subparagraphs 135.5(4) "f"(1) through (5) and to establish the number and positioning of monitoring wells or devices that will detect releases from any portion of the tank that routinely contains product; and

(8) Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

*g. Interstitial monitoring.* Interstitial monitoring between the UST system and a secondary barrier immediately around or beneath it may be used, but only if the system is designed, constructed and installed to detect a leak from any portion of the tank that routinely contains product and also meets one of the following requirements:

(1) For secondary containment systems, the sampling or testing method must be able to detect a leak through the inner wall in any portion of the tank that routinely contains product:

1. Continuously, by means of an automatic leak sensing device that signals to the operator the presence of any regulated substance in the interstitial space; or

2. Monthly, by means of a procedure capable of detecting the presence of any regulated substance in the interstitial space.

3. The interstitial space shall be maintained and kept free of liquid, debris or anything that could interfere with leak detection capabilities.

(2) For UST systems with a secondary barrier within the excavation zone, the sampling or testing method used can detect a leak between the UST system and the secondary barrier:

1. The secondary barrier around or beneath the UST system consists of artificially constructed material that is sufficiently thick and impermeable (at least  $10^{-6}$  cm/sec for the regulated substance stored) to direct a leak to the monitoring point and permit its detection;

2. The barrier is compatible with the regulated substance stored so that a leak from the UST system will not cause a deterioration of the barrier allowing a release to pass through undetected;

3. For cathodically protected tanks, the secondary barrier must be installed so that it does not interfere with the proper operation of the cathodic protection system;

4. The groundwater, soil moisture, or rainfall will not render the testing or sampling method used inoperative so that a release could go undetected for more than 30 days;

5. The site is assessed to ensure that the secondary barrier is always above the groundwater and not in a 25-year flood plain, unless the barrier and monitoring designs are for use under such conditions; and

6. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

(3) For tanks with an internally fitted liner, an automated device can detect a leak between the inner wall of the tank and the liner, and the liner is compatible with the substance stored.

*h. Statistical inventory reconciliation.* Release detection methods based on the application of statistical principles to inventory data that test for the loss of product must meet the following requirements:

(1) Use a leak threshold that does not exceed one-half the minimum detectible leak rate;

(2) The statistical test must be able to detect at least a 0.2 gallon per hour leak rate from any portion of the tank that routinely contains product; and

(3) The report by the SIR company must be a quantitative result with a calculated leak rate and include the leak threshold (leak rate at which a leak is declared), the calculated leak rate (leak rate calculated from the inventory records) and minimum detectable leak rate (minimum leak rate that can be determined from the inventory records).

1. A “pass” means that the calculated leak rate for the data set is less than the leak threshold and the minimum detectable leak rate is less than or equal to the certified performance standard;

2. A “fail” means the calculated leak rate for the data set is equal to or greater than the leak threshold;

3. An “inconclusive” means the minimum detectable leak rate exceeds the certified performance standard and the calculated leak rate is less than the leak threshold. If for any other reason the test result is not a “pass” or “fail,” the result is “inconclusive”;

(4) Owners and operators must notify the department in accordance with rule 567—135.6(455B) when a monthly SIR report of “fail” occurs or two consecutive inconclusive results occur.

(5) Owners and operators must assure the SIR analytical results are complete and available to the department upon request.

(6) The statistical inventory reconciliation method must be certified by a third party and meet US EPA testing procedures in *Standard Test Procedures for Evaluating Release Detection Methods: Statistical Inventory Reconciliation* (EPA 510-B-19-004) May 2019 or as revised by EPA.

*i. Other methods.* Any other type of release detection method, or combination of methods, can be used if:

(1) It can detect a 0.2 gallon-per-hour leak rate or a release of 150 gallons within a month with a probability of detection of 0.95 and a probability of false alarm of 0.05; or

(2) The department may approve another method if the owner and operator can demonstrate that the method can detect a release as effectively as any of the methods allowed in paragraphs “c” to “h.” In comparing methods, the department shall consider the size of release that the method can detect and the frequency and reliability with which it can be detected. If the method is approved, the owner and operator must comply with any conditions imposed by the department on its use to ensure the protection of human health and the environment.

**135.5(5) Methods of release detection for piping.** Each method of release detection for piping used to meet the requirements of 135.5(2) must be conducted in accordance with the following:

*a. Automatic line leak detectors.* Methods which alert the operator to the presence of a leak in pressurized piping by restricting or shutting off the flow of regulated substances through piping or triggering an audible or visual alarm may be used only if they detect leaks of 3 gallons per hour at 10 pounds per square inch line pressure within one hour. An annual test of the operation of the leak detector must be conducted in accordance with paragraph 135.5(1)“a.”

*b. Line tightness testing.* A periodic test of piping may be conducted only if it can detect a 0.1 gallon-per-hour leak rate at one and one-half times the operating pressure. The line leak detection method must be certified by a third party and meet US EPA testing procedures in *Standard Test Procedures for Evaluating Release Detection Methods: Pipeline Release Detection* (EPA 510-B-19-005) May 2019 or as revised by EPA.

*c. Applicable tank methods.* Except as described in paragraph 135.5(2)“a,” any of the methods in paragraphs 135.5(4)“e” through “i” may be used if they are designed to detect a release from any portion of the underground piping that routinely contains regulated substances.

*d. Interstitial monitoring of secondary containment.* Interstitial monitoring may be used for any piping with secondary containment designed for and capable of interstitial monitoring.

(1) Leak detection shall be conducted:

1. Continuously, by means of an automatic leak sensing device that signals to the operator the presence of any regulated substance in the interstitial space or containment sump; or

2. Monthly, by means of a procedure capable of detecting the presence of any regulated substance in the interstitial space or containment sump, such as visual inspection.

(2) The interstitial space or sump shall be maintained and kept free of water, debris or anything that could interfere with leak detection capabilities.

(3) At least every two years, any sump shall be visually inspected for integrity of sides and floor and tightness of piping penetration seals. Any automatic sensing device shall be tested for proper function.

**135.5(6) Release detection record keeping.** All UST system owners and operators must maintain records in accordance with 135.4(5) demonstrating compliance with all applicable requirements of this rule. These records must include the following:

*a.* All written performance claims pertaining to any release detection system used, and the manner in which these claims have been justified or tested by the equipment manufacturer or installer, must be maintained for five years, or for another reasonable period of time determined by the department, from the date of installation. Records of site assessments required for vapor monitoring under subparagraph 135.5(4)“e”(6) and groundwater monitoring under subparagraph 135.5(4)“f”(7) must be maintained for as long as the methods are used. Records of site assessments must be signed by a professional engineer or professional geologist, or equivalent licensed professional with experience in environmental engineering, hydrogeology, or other relevant technical discipline acceptable to the department;

*b.* The results of any sampling, testing, or monitoring must be maintained for at least one year, or for another reasonable period of time determined by the department, except as follows:

(1) The results of tank tightness testing conducted in accordance with paragraph 135.5(4)“c” must be retained until the next test is conducted; and

(2) The results of annual operation tests conducted in accordance with subparagraphs 135.5(1)“a”(3) and (4), must be maintained for three years. At a minimum, the results must list each component tested, indicate whether each component tested meets criteria in subparagraphs

135.5(1) “a”(3) and (4), or needs to have action taken, and describe any action taken to correct an issue; and

(3) The results of tank tightness testing, line tightness testing, and vapor monitoring using a tracer compound placed in the tank system conducted in accordance with paragraph 135.21(2) “f” must be retained until the next test is conducted; and

c. Written documentation of all calibration, maintenance, and repair of release detection equipment permanently located on-site must be maintained for at least one year after the servicing work is completed, or for another reasonable time period determined by the department. Any schedules of required calibration and maintenance provided by the release detection equipment manufacturer must be retained for five years from the date of installation.

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